

of these few remarks are sufficient to establish the general fact, while they certainly do not preclude the necessity of further and closer investigation. I am at a loss to conceive what Mr. Forbes's object has been in penning his remarks; their tendency is certainly to depreciate the knowledge which has been already acquired of one of the most striking and beautiful of the many facts of interest connected with the history of zoophytes.

Cheshunt, July 15, 1843.

BIBLIOGRAPHICAL NOTICES.

An Inaugural Lecture on Botany. By Edward Forbes, F.L.S., F.B.S. &c. Van Voorst, London, 8vo. pp. 23.

THE author of this inaugural address is probably better known to our readers as a zoologist and the historian of the British Starfishes than as a botanist. But amongst those who best know his enthusiastic devotion to the whole range of natural-history science, he has always been distinguished for the extent and accuracy of his knowledge of botany, and we congratulate the Institution with which he is now connected on having obtained the services of so valuable a teacher. It may be important, in the selection of lecturers in our public schools, that men should be sought for who possess a profound and intimate acquaintance with the subjects they are about to teach, but at the same time it should not be forgotten that our branches of science are mere artificial divisions—parts of one great whole, and that to teach one properly, its relations to others should be understood. This is of especial importance in a course of medical education comprising many sciences, where the object is rather the pointing out to the student the relation which each particular science bears to the profession on which he has entered, than making him profoundly acquainted with any particular department. There has been no more prevalent error amongst the great body of medical men, than supposing that the study of disease was their only business, and that the study of the natural-history sciences was a mere impertinence, or at most to be regarded as an ornament; and this error we suspect will always be most prevalent where the chairs of chemistry, botany, &c. in our medical schools are filled by those who are unacquainted with the relations which these subjects bear to the study of medicine. We are glad therefore to see a gentleman educated for the medical profession, a zoologist and geologist, in the chair of botany at King's College.

At the present day there is perhaps too great a tendency to regard education as the mere cramming of so many facts into the heads of the taught, and in no profession is this carried to a more vicious extent than in the medical. It seems to be forgotten that the most effective education is to fit a person, not by the amount of facts that he knows, but by rendering him capable of using the facts that are presented to him, for the skilful exercise of the profession he

has undertaken. It is on this ground that Professor Forbes recommends the study of natural science to the medical student.

“ That the medical student acquires but little by his attendance at botanical lectures, is not an uncommon fancy among the senior members of the profession. Some eminent men have gone so far as to denounce it as lost time. The utmost the student is supposed to carry away is a knowledge of the names, classes and orders of such plants as furnish products used in medicine. It seems to me that the true object of the connexion of natural-history studies with more professional pursuits is, as in this case, too generally lost sight of, and I gladly avail myself of this opportunity to urge their claims on your attention, and to plead for them on grounds which have not been put forward sufficiently prominently hitherto, though by no means novel, seeing that the positions I am about to maintain are avowedly acknowledged in private by most scientific teachers, though rarely advanced in the classroom. The plea which I wish to advance is, that the main use of the natural-history sciences to the student is not merely the teaching him a certain number of facts, the recollection of which may be serviceable to him in after life, but the training his mind, by means of the peculiar forms of research which characterise those sciences, to that tone and vigour which must be of the utmost consequence in giving him power for future professional avocations of a different nature, especially such as are to form the after-occupations of the student of medicine.

“ Not that for a moment I would have you suppose that I am depreciating the value of a knowledge of the facts of natural history,—far from it: I have myself derived too much pleasure, too much benefit from an early study of that delightful science not to appreciate its full value, and not to be desirous of seeing all men acquainted with it; but that, viewing it as a branch of education, I am anxious to point out in what its true educational value lies, and not to evade the question by enumerating how many animals, plants and minerals a student may be able to recognise if he diligently pursue zoology, botany, or mineralogy. A student of any science, well-trained in the modes of investigation which that science teaches, is a much more valuable member of society than a youthful encyclopedia or a living book of facts.”

We believe that this ground on which Professor Forbes would have medical students cultivate botany is the one on which natural science should form a part of the education of the divine, the advocate and the statesman. It may not be of much consequence, that a man should know the Latin name of chickweed, the number of stamens in a butter-cup, or the shape of the blood-globules of a frog, but it is of importance that he should understand the laws of organic matter, and be acquainted with the nature of its investigations. It is in these investigations that the simplest principles of analysis and synthesis may be exemplified, and in which they will bear their most profound application. We know that the advocate of a classical and mathematical education will say that language and numbers afford sufficient material for the application of these principles, but we maintain that there is as much difference between the investigation of words as the expression of facts or phænomena, and the investigation of facts themselves, as there is between words and numbers themselves, and upon this ground we would require of every one seeking distinction as an educated man, a knowledge of the natural sciences.

But to return to Mr. Forbes. After adverting to the importance

of the study of botany as a training science, he proceeds to point out the value of its facts to various classes. To the medical man and the agriculturist they are essential. We recommend the following to our readers :—

“The utility of a study of botany to the zoologist and geologist cannot be too highly estimated. The perfection to which the labours of Linnæus, DeJussieu, DeCandolle and their numerous co-labourers and pupils have brought systematic botany, furnishes the zoologist with a sound model on which to mould the descriptive part of his science, but one with which he is usually I fear too slightly acquainted to make good use of. Zoology has yet to attain the precision to which botany so rapidly advanced through the logical acuteness of the great minds who embraced the study,—a precision greatly forwarded by the general knowledge of their subject which they considered it their duty to acquire before they engaged in original special research. The perfection to which botanical diagnosis has attained is truly astonishing. More than 50,000 species of known plants are distinguished from each other by short summaries of their essential characters, sometimes occupying but a few words, and at most but a few lines. Yet there is no confusion. The printed diagnosis is sufficiently precise to enable the student to ascertain the name and affinities of any plant he may gather even without the help of figures or other artificial aid. That zoological science may attain an equal degree of precision, no thinking naturalist can for a moment doubt; but until more zoologists than now do, study the principles by which such precision has been attained, their science must rest in the unsatisfactory state which deforms great portions of it at present.

“The importance of a knowledge of botanical science to the geologist rests on different grounds. Perhaps to him its greatest value may lie in conferring that training which I have advocated in commenting on the botanical studies of the physician. But it is also of the greatest use in enabling him to understand the nature and relations of the numerous fossil remains of vegetables imbedded in the earth’s strata, and the examination of which affords such important data for determining the relative ages of formations, and the conditions under which they were formed. When we recollect that the great beds of coal, which furnish such a valuable item in the list of our economical comforts, have been derived from the destruction of ancient herbs and trees, we must view with astonishment the important part played by the vegetable kingdom in contributing to the substance of the earth’s crust.”

At a time when our manuals, local floras, and guide-books have rejected the Linnæan system, many of our older friends who have had no other guide to the mysteries of classification, and have been surprised to see it so suddenly and generally supplanted, will read with interest the following testimony in its favour :—

“Those who slightly think of the Linnæan system, as it is termed, forget in the present to look back fully and fairly on the past. They should remind themselves of the state in which botany was when Linnæus undertook to make its treasures consultable. The understanding of things depends greatly on the perception of their order and relations. When that order and those relations require deep study ere we can comprehend them clearly, the man who gives us a clue, however insignificant it may be in its own nature, is not only conferring on us an invaluable benefit, but endowing the despised instrument with golden value. Such a clue did Linnæus give when he put forth the sexual system. The scientific systematist, surrounded by the stores of his herbarium, should not forget that those treasures were often amassed

in the first instance by adventurous and earnest men, rendering good service by their hands and energy, as good in its humble way as that which he gives by his head and philosophy. It was not to be expected of such men that in the field they should occupy themselves with thoughts of arrangement or affinity; their part was to observe and select, and the guide to their observation and selection was in most cases no other than the Linnæan system. In the scientific hive as in the apiary there must be working-bees and neuters as well as queens and drones: it is necessary for the economy of the commonwealth. An easy means of acquiring and arranging information is a great help to the workmen of science, and no department has gained more thereby than botany, which, through the facilities afforded by the artificial method devised by Linnæus, has had its facts amassed in enormous quantity for the use of its more philosophic votaries, and owes its present advanced state in a great measure to such humble means.

“The clue to the labyrinth, then, having served such noble purpose becomes a consecrated object, and should rather be hung up in the temple than thrown aside with ignominy. The traveller returning from his adventurous and perilous journey of discovery, hangs up his knapsack with affection on the wall of his study. But travellers must return to the fields, if more is to be done; and so must botanists, and each must have recourse again and again to those helps which aided them so well in their earliest journeys.”

We are quite willing to hang this system up in the temple anywhere as long as it does not interfere with plants, and we think, as far as our own island is concerned, especially since the publication of Lindley's ‘Synopsis,’ the last edition of Hooker's ‘Flora’ and Babington's ‘Manual,’ that we should never wish again to disturb its dignity by carrying it into the fields. In conclusion, we recommend Professor Forbes's lecture as well worth the attentive perusal, not only of the student and teacher of medical science, but of all who take an interest in the advancement of sound education.

Recherches sur l'organisation, la fructification et la classification de plusieurs genres d'Algues, avec la description de quelques espèces inédites ou peu connues.

Essai d'une répartition des Polypiers calcifères de Lamouroux dans la classe des Algues. Par J. F. Chauvin: Caen, 1842.

These memoirs, which were prepared as academical theses, are of considerable interest to the algologist, both physiologically and systematically. Several points regarding obscure or little-known species are illustrated, and the different questions which have lately interested algologists are discussed with little of that controversial tone which has, we know not how, insinuated itself into several recent memoirs on the subject. The notions of Decaisne on the double fructification of Algæ are ably treated, and are, at least, shown to be premature. The opinion of algologists, both theoretical and practical, is opposed to them; and Mr. Griffiths especially, who has devoted years to the study of the marine Algæ, is satisfied that they are incorrect. We cannot, however, at present consider the subject as at all settled, especially supported as it is by what is known of the germination of Algæ.

It appears that there are very many modes of reproduction amongst

Algæ. Dulz, in his third memoir, mentions four modes of reproduction which he has observed in the *Ceramia*. Messrs. Crouan have traced the vegetation of the sphaerospores before their separation into four distinct bodies, while Agardh has observed the germination of the spores of which the sphaerospore are composed, and also that of the spores contained in the capsules. And in the zoospermic Algæ, both the zoosperms and spores produce perfect plants. The probability is that all are in the main correct, and that their views are not irreconcilable, however different they may appear at first; and truth will appear at length, not by the questioning of the observations of others, but by the patient and unprejudiced comparison of all.

Much remains to be done as regards the arrangement of Algæ, and it is very much to be desired that Dr. Montagne, who has perhaps in his hands the largest mass of original matter of any algologist, and that in great measure ready for publication, would devote his attention to the subject generally, to which he would, we doubt not, do as much justice as he has done in his notices of individual genera or tribes. The ample materials he possesses, his admirable tact in microscopic researches, his accurate pencil, his intimate acquaintance with all that has been published in various languages, and above all his unwearied diligence, his accurate judgement and his very luminous style of writing, are all guarantees of his especial fitness to undertake a complete revision of the subject, which could not fail to promote exceedingly this branch of botany.

It is now proved incontestably that the calciferous Polypiers of Lamouroux belong to the order of Algæ. The memoirs of Kutzing and Decaisne are decisive on the subject, and the observations made by Chauvin, which are very judicious and interesting, would tend to confirm their views, if they needed confirmation. We recommend the work of the learned Professor, who has been long known to science by his labours in this beautiful tribe of plants, as one which cannot fail both to instruct and interest.

As regards the analogies of *Podaxineæ*, M. Montagne remarks, that *Spumaria* reminds us of *Gyrophragmium*; that *Æthaliæ* is of a celluloso-spongy substance, as *Secotium*; and finally, that there is a columella in *Stemonitis* and many other genera.

The memoir closes with the following considerations:—From the researches of Mr. Berkeley it appears that a multitude of subterraneous fungi (*Fungi hypogæi*), which, after a deceptive analogy, had been improperly referred to *Tuberaceæ*, belong beyond all doubt to *Lycoperdaceæ*, and that these, at least as regards their mode of fructification, are much nearer to the *Hymenomycetes*; while the *Tuberaceæ*, regarded from the same point of view, bear more resemblance to the *Discomycetes* of Fries, or to the *Hymenothecia* of Persoon, since the reproductive bodies being contained in asci are real sporidia. The recent labours of Tulasne and Vittadini have confirmed these observations, which may now be regarded as established in science.

If now we would follow in thought the succession of different forms by which, in their ascending series, the fungi of the two families to which the names of *Hymenomycetes* and *Gasteromycetes*

have been given, it cannot escape our notice, notwithstanding their apparent difference, that the same plan has presided at their formation, or in other words, that they possess a unity of structure. We observe, however, this remarkable circumstance in their mode as in their degree of evolution, that the one always seek the light, under the influence of which the principal phænomena of their fructification take place, while the others pass through the first, or all the phases of their life, free from the influence of this modifying power; that is to say, that they ripen their spores in a closed receptacle, and that in general this opens only when they are ready for dispersion. The evolution of the second is, as we may say, of a lower grade than that of the first. But in comparing *Gyrophragmium* especially with an Agaric, it is easy nevertheless to perceive the perfect analogy which exists between the two series, examined towards their culminating point. The resemblance would be still more striking and almost complete, at least as regards external form, if it be proved some day that *Montagnites* belongs also to the *Gasteromycetes*, as we are permitted to suspect from its affinity with *Gyrophragmium*. It is then that the simplicity and independence of the partitions,—carried to the highest degree, since they are fixed to the top of the stem by a single point, frequently by a short thread, and radiate horizontally like the gills of an Agaric,—it is then, I say, that this independence and simplicity would raise the *Gasteromycetes* almost to the same grade as the *Hymenomycetes*, always however considered abstractedly of their morphosis, which is essentially different*.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

February 1, 1843.—“On the Geological position of the *Mastodon giganteum* and associated fossil remains at Bigbone Lick, Kentucky, and other localities in the United States and Canada.” By Charles Lyell, Esq., V.P.G.S.

With a view to ascertain the relations of the soil in which the bones of the Mastodon are found, to the drift or boulder formation, whether any important geographical or geological changes had taken place since they were imbedded, and what species of shells are associated with them, Mr. Lyell visited a number of places where they had been obtained. In this paper he gives the result of his researches.

The most celebrated locality visited was Bigbone Lick, in the northern part of Kentucky, distant about 25 miles to the S.W. of Cincinnati, situated on a small tributary of the river Ohio called Bigbone Creek, which winds for about 7 miles below the Lick before joining the Ohio. A “Lick” is a place where saline springs break

* The latter part of this article is translated from ‘L’Institut,’ May 4, 1843.